of a postulated entity or process, e.g., biochemistry specifies the physical realization of entities postulated by the operon theory in genetics; (d) cause–effect; e.g., biochemical interactions are a cause of heritable patterns of gene expression. More recently Darden (Darden & Craver, 2002; Darden, 2005) has emphasized mechanisms as a frequent focus of interfield theories, and indeed, all four of these relationships figure in accounts of mechanisms.

My interest here is not in interdisciplinary research generally, but rather in interdisciplinary research that gives rise to a new discipline. New disciplines do not always result even if the interdisciplinary engagement is maintained over a long period of time. In Bechtel (1986a) I contrasted cases such as cognitive science, in which scientists maintained their primary allegiances to the contributing disciplines (e.g., psychology, artificial intelligence, linguistics), with cases such as biochemistry, in which a new discipline developed that secured the primary commitment of future practitioners. I characterized the former as *interdisciplinary research clusters*. Although they develop similar institutional structures as disciplines (professional societies and journals) and are interested in a common domain of phenomena, clusters do not employ distinctive research techniques. Rather, collaborators draw upon the techniques and employ the standards of successful explanation from their home disciplines. Collaboration is motivated by the advantages of coordinating the results of multiple disciplines in understanding a phenomenon of common interest.

Interdisciplinary research gives rise to new disciplines when research addresses phenomena that are not the focus of any of the contributing disciplines and involves new research tools and techniques that facilitate the new inquiry. These also enable researchers to pursue explanatory goals that are not those of any of the existing disciplines. When new institutional arrangements are developed, they tend to become the primary institutional home of the practitioners and they will characterize themselves using the name of the new discipline. This, I will argue, is what happened in the case of cell biology.

3. THE NEW DISCIPLINE OF CELL BIOLOGY

By the late 1960s cell biology had acquired the characteristics I identified for disciplines in the preceding section. Cell biologists pursued a distinctive domain (cell organelles and their functions), employed a new set of tools (especially electron microscopy and cell fractionation), pursued a distinctive mission (determining the mechanisms that enabled organelles to perform their functions), and created new professional institutions (especially journals and